MATLAB Implementation of Image Segmentation Using Drop Fall Algorithm

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Abstract: Image engineering is the most prominent area in the progressing electronics world. The crucial step in image engineering is image segmentation (under image analysis) since it involves extraction of useful information from the images. Usually it commences with extraction of image from background. The main objective of image segmentation is extraction of relevant parts. In the systematized world automatic image analysis is most demanding chore which is the middle layer of image engineering. By using MATLAB an algorithmic code is instigated. Drop fall algorithm fakes an object such as a drop of water and trundle above the input whether characters or numbers and glide down the contours. The algorithm is similar to hit and deflects strategies in selecting starting point and track certain conventions. The MATLAB implemented image segmentation process treasures a life sized application in the area of diagnosing cancer cells and recognition of iris and fingerprint in forensic field.

Introduction

The process of partitioning a digital image into multiple segments is known as image segmentation. The objective of segmentation is to streamline the depiction of image into more meaningful and informative which can be analyzed easily. The objects and boundaries of the image can be traced classically by image segmentation.

More specifically image segmentation is designating a label to every pixel such that pixels with same label have same characteristics. The characteristics include color, intensity or texture. As a result, a set of contours is extracted from the image. Adjoining regions are significantly different with respect to same characteristics.

Thresholding

Thresholding is the simplest method of image segmentation. The clip level (threshold value) is selected such that the gray scale image is converted to binary image. Selecting a threshold value is the fundamental principle behind this method. Present day industries are replenished with several methods.

Drop Fall Algorithm

Many methods have been evolved to segment the connected characters. Drop fall algorithm the brain child of image segmentation help in resolving the issue and easily segment the hand written characters. Drop fall algorithm follows raindrop motion. The algorithm trolls from above the characters along its contour and cuts through the contour when it cannot troll further. The segmentation trace could be obtained by following the set of rules. Concretely the segmentation trace can be obtained as the
algorithm selects a pixel out of the neighbours of the current pixel as a new pixel.

**Types Of Drop Fall Algorithm**

Depending on the direction and starting point of the drop fall, it can be classified into following types

- Top-left
- Top-right
- Bottom-left
- Bottom-right

The drop fall algorithm commences in a specific corner and proceeds to the opposite corner. The crucial note is that variants that initiate from bottom of the image will proceed upwards. It is comparable to invert the image about horizontal axis and executing drop fall algorithm to the inverted image.

**Top-Left Drop Fall**

The algorithm is identical to standard drop fall. It initiates from top left of the connected characters and once it encounters a connected component instead of falling to left it turns right. It is employed if the image is flipped vertical.

**Top-Right Drop Fall**

The top right algorithm follows top left with change in the intended directions. It begins from top right and trolls over the contour of the connected characters, once the motion of the path is obstructed it will drop towards left resulting in segmentation. The image which is flipped vertical can be segmented using this type.

**Bottom-Left Drop Fall**

The bottom left algorithm initiates from the bottom left pixel of the image and trols upward. When it encounters a connected path it will move towards right and the image is segmented. It is implemented to the image which is flipped along its horizontal axis.

**Bottom-Right Drop Fall**

The bottom right drop fall mimics bottom left except from the fact that it commences from bottom right and on confronting the hurdle it will proceed towards left. The input image is instigated by performing a drop fall on an input image which is flipped along its horizontal axis.

**Extended Drop Fall Algorithm**

The extended drop fall algorithm is introduced to overcome the short comings of drop fall algorithm. When the raindrop moves into small concaveness on the contours of the
Even though the inertial drop fall algorithm can overcome shortcomings of the traditional drop fall algorithm it has its own disadvantages. That is incorrect segmentation may occur when it falls through break and accent. But when we assume that the drop is big enough such that it will overcome break and accent. As a consequence the outcome is perfect with proper segmentation.

Applications

Medical Imaging

- Measure tissue volumes
- Computer-guided surgery
- Diagnosis of cancer cells
- Treatment planning
- Study of anatomical structure

Face Recognition

A computer application for automatic identification or verification of a person from digital image or video frame is the face recognition system. It can be done by comparing selected facial features from the image and a facial database. It is typically used for security systems.

Iris Recognition

An automated method of biometric identification that uses mathematical pattern recognition techniques is the iris recognition. It is done on video images of iris of an individual’s eye whose complex patterns are unique.

Fingerprint Recognition

Fingerprint recognition is an automated method which compares two human fingerprints. These fingerprints are used as identity to the individuals.

MATLab

Matrix laboratory is the numerical computing environment and fourth generation programming. It is developed by math works. MATLab allows matrix manipulations, lotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and FORTRAN.

Drop Fall Algorithm Output
Conclusion

Thus the drop fall algorithm is utilized to implement image segmentation of hand written characters using MATLAB. The noisy original image is converted efficiently into segmented informative image.

Reference

1. Digital image processing - Rafael C. Gonzalez
2. Image segmentation and extraction Richard E. woods
3. www.wikpedia.com
4. www.studentstechogy.com
5. www.everlight.com
6. www.alldatasheets.com